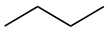
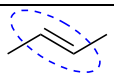
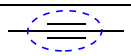
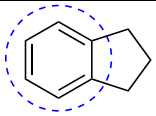
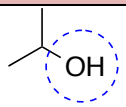
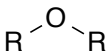
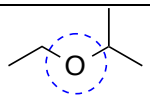
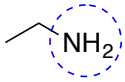
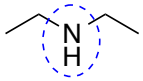
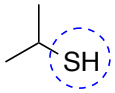
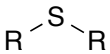
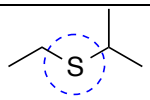
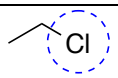
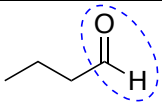
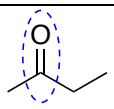
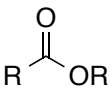
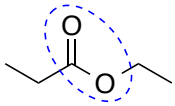
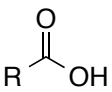
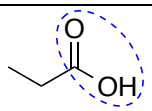
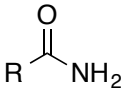
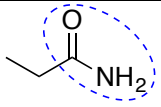
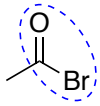
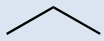
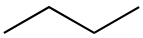
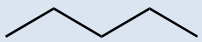
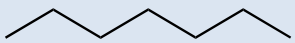
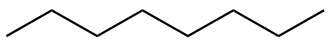
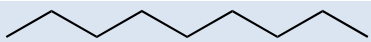
Chemistry 233
Functional Groups and Alkane Nomenclature

Organic Functional Groups

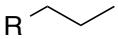
Hydrocarbons		
Name	**Functional Group**	**Examples**
Alkane (not really a functional group)	R–H	
Alkene	$R_2C=CR_2$	
Alkyne	RC≡CR	
Arene (Aromatic)		
Heteroatom Containing		
Alcohol (hydroxy group)	R–OH	
Ether		
Amine (amino group)	$R-NH_2$ R_2NH R_3N	 
Thiol (mercapto group)	R–SH	
Sulfide		
Halide	R–X (X = F, Cl, Br, I)	
Carbonyl (C=O) Containing		
Aldehyde		
Ketone		
Ester		
Carboxylic Acid		
Amide		
Acid Halide		

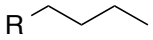
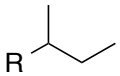
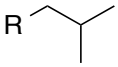
Straight Chain Alkanes

Name	# of Carbons	Condensed Structure	Skeletal Structure
Methane	1	CH_4	None
Ethane	2	CH_3CH_3	
Propane	3	$CH_3CH_2CH_3$	
Butane	4	$CH_3(CH_2)_2CH_3$	
Pentane	5	$CH_3(CH_2)_3CH_3$	
Hexane	6	$CH_3(CH_2)_4CH_3$	
Heptane	7	$CH_3(CH_2)_5CH_3$	
Octane	8	$CH_3(CH_2)_6CH_3$	
Nonane	9	$CH_3(CH_2)_7CH_3$	
Decane	10	$CH_3(CH_2)_8CH_3$	

Some Common Alkyl Substituents

R=parent chain

			
Methyl (-Me)	Ethyl (-Et)	Propyl (-Pr)	Isopropyl (-iPr)

			
Butyl	*sec*-Butyl	isobutyl	*tert*-Butyl

Summary of Rules for Naming Acyclic Alkanes

1. **Find the longest continuous carbon chain and name it as the alkane parent.**
   - If two chains of equal length are found, pick the one with the most branches as the parent.
2. **Number the carbon atoms in the chain.**
   - Number in the direction that gives the first substituent the lowest number.
   - If numbering from both directions gives the first substituent the same number, then number so that the second substituent has the lowest possible number.
   - If there is a numbering tie in both directions, then you should use alphabetical priority.
3. **Number and name substituents.**
   - Place a number in front of a substituent name followed by a dash (i.e. 2-ethyl). If there is more than one of the same substituent present, designate with a prefix (di-, tri-, tetra-, penta-){i.e. 2,4,6-triethyl}.
4. **List substituents in alphabetical order followed by the parent name.**
   - Prefixes such as di-, tri-, tetra-, penta-, *sec*-, and *tert*- do not count for alphabetization purposes. Iso and cyclo both count for alphabetization purposes.
   - Numbers are separated with commas. Numbers and names are separated with dashes.